$V.I.$

VEKSLER, V.J.; VODOPJANOV, A.F.; JEFREMOV, D.V.; MINC, A.Z.; VEISBEIN, M.M.;
GASEV, M.G.; ZEJDLIC, A.J.; IVANOV, T.P.; KOLOMENSKIJ, A.A.; KOMAR, E. G.;
M A L Y S E V, J.E.; MONOSZON, M.A.; NEVJAZSKIJ, J.Ch.; PETUCHOV, V.A.;
RABINOVIC, V.A.; RUBCINSKIJ, S.N.; SINELNIKOV, K.D.; STOLOV, A.M.;
KULT, Karel, inz.

The synchrophasotron for particle acceleration to 10 BeV energy of the
Soviet Academy of Sciences. Jaderna energie 3 no.1:5-9 Ja '57.

1. Ustav jaderno fysiky (for Kult).

VEKSLER, V.

"With the Speed of Light," by V. Veksler, Corresponding
Member of the Academy of Sciences USSR, director of the
Laboratory of High Energy Physics, Moscow, Pravda, 11 Apr 57

The following are excerpts from a statement issued in conjunction with
the opening of the 10 Bev synchrophasotron:

"In a huge hall filled with the works of the modern industrial giant,
Prof V. A. Petukhov, director of the engineers section, L. P. Zinov'yev,
K. V. Cheklov, N. I. Pavlov, and other enthusiasts could be seen day and
night preparing to trigger the new atomic .achine....

"The giant synchrophasotron is intended to accelerate 'elementary'
particles of matter and give them superhigh energies, that is, to create
optimum conditions for studying the atomic nucleus....

"The following figures describe the scale and extraordinary accuracy
of the new machine. The ring of electromagnets weighs 36,000 tons and
the average diameter of the steel ring is almost 60 meters. Pressure in
the vacuum chamber, inside which the accelerated particles move, is reduced
to one billionth of an atmosphere. This is attained through the constant
operation of 56 powerful pumps. The magnetic field which continuously
acts on the accelerated particles can be adjusted to an accuracy of one
tenth of a percent....

Sum. 1345

"A large group of theoretical physicists, under the direction of M. S. Rabinovich and A. A. Kolomenskiy, worked at the Physics Institute of the Academy of Sciences USSR and carefully and thoroughly analyzed the motion of particles in the accelerator....

"On 15 March, the so-called quasi-betatron operation cycle of the reactor was established by L. P. Zinov'yev, director of the start-up group, and his co-workers, S. K. Yesin, S. S. Nagdas'yev, V. P. Sarantsev, Engineers A. A. Kapralov, S. A. Mashinskiy, G. S. Kazanskiy, and others....

"In 3.3 seconds particles made 4.5 million revolutions in the chamber, covering, in this time, a million kilometers and moving with a speed almost that of light.

"The process of accelerating particles in the synchrophasotron can be briefly described as follows. At a certain moment, the particles 'burst' into the chamber from a linear accelerator developed at the Khar'kov Physico-technical Institute under the direction of Prof K. D. Sinel'nikov. The magnetic field controlling the particles slowly increases with time. The period in which the particle makes one complete revolution is shortened. The frequency of the electric field accelerating the particles is increased to correspond exactly to the change in the length of a single orbit....

SYM. 13 45

"A week after the quasi-betatron cycle was established in the synchrotron, an energy of 2 Bev had been imparted to the particles. After this, the energy was raised to 8.3 Bev.

"The workers at the laboratory are currently aiming toward putting the synchrophasotron at the disposal of physicists of the Joint Institute of Nuclear Research within the shortest possible time....

"Despite the rapid growth of knowledge, current physics does not yet have any unified picture of the nature of nuclear forces. It does not know, for example, the relations between the various mesons, and how they are related to nucleons; it does not have any picture of the mutual transitions of mesons. These problems can be solved by the use of powerful accelerators ...." (U)

Sum.1345

VEKSLER, V.I., BELOUSOV, A.S., POPOVA, V.M., SEMASHKO, N.G., SHITOV, E.V.,
TAMM, Ye.I., YAGUDINA, F.R.

"Photoproduction of Pions Complex Nuclei," paper presented at
CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30,
1957

VEKSLER, V.I., ADAMOVICH, M.I., KUZMICHEVA, G.V., LARIONOVA, V.G., KHARLAMOV, S.P.

"Photoproduction of Negative π Mesons on Deuterium," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

VEKSLER, V. I.

"Coherent principle of Acceleration of Charged Particles,"
paper presented at CERN Symposium, 1956, appearing in Nuclear
Instruments 1. No. 1. pp. 21-30, 1957

VEKSLER, V.I.

USSR/Nuclear Physics - Instruments and Installations
      Methods of Measurement and Investigation   C-2

Abs Jour   : Referat Zhur - Fizika, No 1, 1958, 234

Author   : Veksler, V.I.
Inst   : _____
Title   : Coherent Principle of Acceleration of Charged Particles.

Orig Pub   : Atomn. energiya, 1957, No 5, 427-430

Abstract   : Derivation of a new principle of acceleration of charged
            particles. Its characteristic feature is that the elec-
            tric field, which accelerates the particles is not exter-
            nal, but occurs as the result of an interaction of a
            group of accelerated particles, small in geometric size,
            with a group of fast light charged particles, with plasma
            or with an electromagnetic wave. The author indicates the
            conditions under which the interaction of all the parti-
            cles of the cluster are coherent, so that the interaction
            force is proportional to the square of the number of
            particles in the cluster (N^2), and consequently the force
Card 1/2   per particle is proportional to N. In this case the acceleration
            can be sufficiently effective.

VEKSLER, V. I.

"Start up of 10^9 eV Proton Synchrotron at the Joint Institute for Nuclear Research and the Results of Investigations."

paper to be presented at the 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

VEKSLER, V. I.

The Annual Meeting of the USSR Academy of Sciences 1957.   26-58-5-33/57
Priroda, 1958, No. 5, pp. 105-107.
                International Astronomical Congress, which will take place
        in Moscow on 1? August 1958, where over 1,000 foreign scien-
        tists are expected. Member-Correspondent V.I. Veksler deli-
        vered a paper "On the Present State of the Problem of Acce-
        leration of Atomic Particles". He presented a survey on past
        and present methods and apparatuses used for the acceleration
        of protons, deuterons, alpha particles and in the obtaining
        of mesons. He stressed the future prospects of the physics
        of high energy particles and quoted the names of Soviet
        scientists who contributed largely to these problems: V.I.
        Petukhov, M.S. Rabinovich, A.M. Kolomenskiy, Ya.B. Faynberg
        and G.I. Budker. He also presented his idea of a new prin-
        ciple of acceleration of atomic particles, the so-called
        coherent principle.

AVAILABLE: Library of Congress

Card 6/6

        1. Scientific organizations - USSR   2. Scientific
            Research - USSR

VEKSLER, V.I.

The problem of particle accelaration. Jaderna energie 4 no.11:
351-354 N '58.

21(9)   SOV/56-35-5-4/56
AUTHORS: Veksler, V. I., Kovrizhnykh, L. M.

TITLE: On the Cyclic Acceleration of Particles in High Frequency
            Fields (O tsiklichoskom uskorenii chastits v vysokochastotnykh
            polyakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
            Vol 35, Nr 5, pp 1116-1118 (USSR)

ABSTRACT: The present paper aims at showing that it is possible to use
            high-frequency fields for the purpose of controlling the
            motion of particles in cyclic accelerators. (This work was
            carried out already in 1956). Already in 1947 Burshteyn and
            Kolomenskiy (Ref 1) as well as one of the authors of this
            paper devoted their attention to the possibility of a cyclic
            acceleration of charged particles by rapidly changing magnetic
            fields. The present theoretical investigation of particle motion
            in a field is based on the assumption that the particles move
            in the field of a plane standing wave: $E_y = E_0 \cos kx \sin \omega t$

            $H_z = - H_0 \sin kx \cos \omega t$, where E_0 and H_0 denote the ampli-
            tudes of the electric and magnetic fields, respectively. The
Card 1/2   equation of motion is:

On the Cyclic Acceleration of Particles in High Frequency Fields   SOV/56-35-5-8/56

$$\frac{d}{dt} m\dot{x} = \frac{e^2}{mc^2} \frac{H_o E_o}{2k} \sin 2kx \cos^2 \omega t.$$ For the investigated form of particle motion in a coaxial cylindrical resonator (the axis of which coincides with the z-axis) the following is obtained after coordinate transformation:

$$\frac{d}{dt} m\dot{r} = mr\,\dot{\theta}^2 + eE_r - \frac{e}{c} H_o \dot{z} \;;\; \frac{d}{dt} mr^2\,\dot{\theta} = 0;$$

$$\frac{d}{dt} m\dot{z} = eE_z + \frac{e}{c} \dot{r} H_o.$$

Furthermore, the system of equations for E_r, E_z and H_θ is written down, and a solution is derived for $\varrho/R_o \ll 1$ in first order of ϱ/R_o as well as for $k/\varrho \ll 1$. ($r = R_o + \varrho$, $R_o = a+b/2$, a and b are the outer and inner radii respectively of the cylinder). There are 3 references, 2 of which are Soviet.

Card 2/2

Physics Inst. im P. N. Lebedev, AS USSR

.AUTHOR: Veksler, V. I.   SCV/53-66-1-5/11

TITLE: The Present State of the Problems Concerning Acceleration of
                Atomic Particles (Sovremennoye sostoyaniye problemy uskoreniya
                atomnykh chastits)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol. 66, Nr 1,
                pp. 99 - 11o (USSR)

ABSTRACT: This is the reproduction of a lecture which the author held
                at the general meeting of the AS USSR on March 27, 1958. First
                a short historical review of the development of the
                accelerators and their importance in physics is given. Sub-
                sequently the separate types are discussed and a survey on
                the internationally employed systems of accelerators is given
                a)Circular electron accelerator: synchrotron. One of the
                first ones in the world exists in the Fizicheskiy institut
                imeni P.N.Lebedeva AN SSSR (Physics Institute imeni P.N.Lebedev
                AS USSR), 1947, 30 MeV; many different systems in various
                countries, at present operate at up to 1.5 BeV, and others are
                being built for 7 BeV.   In the USSR at the Fizicheskiy institut
Card 1/3   (Physics Institute) a synchrotron with 280 MeV and at the

The Present State of the Problems Concerning   SOV/53-66-1-5/11
Acceleration of Atomic Particles

Leningradskiy fiziko-khimicheskiy institut (Leningrad
Physical-Chemical Institute) one with 100 MeV is under
construction. b) Phasotron (synchrocyclotron) for acceleration
of protons, deuterons, and α-particles. A large phasotron
exists in the USSR at the Ob"yedinennyy institut yadernykh
issledovaniy (United Institute of Nuclear Research (Mesh-
cheryakov, Yefromov, Mints); c)Synchrophasotron. In the USSR
at the United Institute of Nuclear Research one is found with
10^{10} eV, operating unto 10^{-3} microamperes. The discovery
of the neutral meson, of the antiproton, and of the anti-
neutron was carried out in the synchrophasotron, hence its
great importance for physical research and the efforts to
increase the energies to $3 - 5.10^{10}$ eV. In the USSR experiments
supervised by Vladimirskiy, Kolar, Mints and Yefremov are
made to reach 5.10^{10} eV by hard focusing; the weight of such
an accelerator: 30 000 t. Pulses: Cyclotron: 10^7 per second,
phasotron at the United Institute of Nuclear Research: 100/sec;
in the synchrophasotron (10^{10} eV) one pulse per about 12
seconds. 1953: V.A. Petukhov, M.S.Rabinovich, A.A.Kolomenskiy
Card 2/3   elaborated the method of backward beams. Theoretical inves-

The Present State of the Problems Concerning   SOV/53-66-1-5/11
Acceleration of Atomic Particles

tigations of accelerators and processes of acceleration in
the USSR are carried out by: M.S.Rabinovich, A.A.Kolomenskiy,
A.M.Budker and Ya.I.Feynberg.

1. Particle accelerators--Equipment   2. Particle accelerators--Per-
formance

Card 3/3

Veksler, V. I.

AUTHOR: Veksler, V. I., Corresponding Member of the AN USSR   20-2-15/60

TITLE: On a New Mechanism for Producing Relativistic Electrons in the Cosmic Space (O novom mekhanizme generatsii relyativistskikh elektronov v kosmicheskom prostranstve)

ABSTRACT: The aim of this work is a reference to a very simple and general mechanism for producing fast electrons. According to the opinion of the author, this mechanism (maybe only partly) can be the reason of that radiation, which comes to the earth from cosmic objects. It is shown here that the motion of a quasi-neutral curd of a completely ionized plasma in an inhomogeneous magnetic field must be accompanied by a production of relativistic electrons. This statement essentially is based upon the law of conservation of energy. First the author discusses the mechanism of acceleration, he examines a curd of a quasineutral plasma, limited in the space, which equally contains positive ions and electrons. This curd, as a whole, has the velocity of translation v_o. The author here restricts,

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On a New Mechanism for Producing Relativistic Electrons in the Cosmic Space   20-2-15/60

on account of better vividness, on the case that for the initial velocity of the curd $v_0 < c$ is valid. First some conditions are given. On occasion of the input of the curd into the magnetic field a Lorentz-force F_0, which in its magnitude is equal (but in its direction is vice-versa), starts acting upon the electrons and ions of the curd. This Lorentz-force is produced by the radial component of the magnetic field. This force accelerates the electrons and ions of the compression in a plane square with the direction of the translatory motion of the curd. The acceleration is turn-about proportional with the mass of these particles. According to this, the cyclic currents of ions and electrons will be different. These currents, on their side, result, in case of the existence of a radial component of the field, the formation of Lorentz-forces, which act upon the electrons and ions and are directed in such a way that they slow down the translatory motion of the curd as a whole. The velocity of translation of the electrons will decrease faster than the velocity of the ions. The centers of mass of the electron-part and of the ion-part of the curd shift against each other. If the curd sufficiently contains particles of both signs, the elec-

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On a New Mechanism for Producing Relativistic Electrons in the Cosmic Space

20-2-15/60

.tric field "fastons" the electrons of the curd to the ions, and the electrons follow the ions. At the same time the electrons will slow down the ions. Finally a formula for the average energy of each of the electrons is given. There is 1 reference, which is Slavic.

SUBMITTED: November 1, 1957

AVAILABLE: Library of Congress

Card 3/3

VEKSLER, V. I.   (Dubna)

"The Nucleon-Nucleon and Pion-Nucleon Interaction ."

report presented at (the session on Strong Interactions of Ordinary Particles)
the Intl. Conference on High Energy Nuclear Physics, Kiev, 15-25 July 1959.

VEKSLER, V. I.

·21(0) p.2, 7   PHASE I BOOK EXPLOITATION   SOV/2081

International Conference on the Peaceful Uses of Atomic Energy, 2d., Geneva, 1958

Doklady sovetskikh uchenykh; yadernaya fizika (Reports of Soviet Scientists; Nuclear Physics) Moscow, Atomizdat, 1959. 552 p. (Series: Its: Trudy, Vol. 1) 8,000 copies printed.

Eds. (Title page): A.I. Alikhanov, Academician; V.I. Veksler, Academician; and N.A. Vlasov, Candidate of Physical and Mathematical Sciences; Ed. of this volume: S.I. Drozdov and D.F. Zaretskiy, Candidates of Physical and Mathematical Sciences; Ed. (Inside book): G.L. Smolyan; Tech. Ed.: Ye.I. Mazel'.

PURPOSE: This collection of articles is intended for scientific research workers and other persons interested in nuclear physics. The volume contains 43 papers presented by Soviet scientists at the Second Conference on Peaceful Uses of Atomic Energy, held in Geneva in September 1958.

COVERAGE: It is divided into two parts. Part I contains 17 papers dealing with plasma physics and controlled thermonuclear reactions, and Part II contains 26 papers on nuclear physics, including problems of particle acceleration and of cosmic ray physics. The first paper by L.A. Artsimovich presents a review of Soviet work on controlled thermonuclear reactions. The remaining papers in

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Reports of Soviet Scientists; Nuclear (Cont.)   SOV/2081

Part I deal with particular problems in this field. In Part II the two articles most representative of Soviet work in nuclear physics are those by V.I. Veksler and N.N. Bogolyubov. The paper by Veksler, "Startup of л 10-Bev Synchrophasotron and the First Results of Physical Research", deals with advanced work in nuclear physics using one of the most advanced and powerful tools in nuclear studies. A general description of the apparatus is given, together with a number of photographs showing different views. In his paper, "Investigations of the Many-body Problem and Their Application to the Theory of Nuclear Matter", N.N. Bogolyubov deals with the phenomena of superconductivity and superfluidity and with the development of the phenomenological and the microscopic theories. He states that he has developed a new approach to the theory of heavy nuclei, and relates that he and a number of other Soviet scientists undertook a systematic investigation of Frohlich's work on superconductivity. He claims to have fully verified Frohlich's conceptions of the state of superconductivity. He also states that his approach, based on the superfluidity concept of nuclear matter, will be effective in revising the existing statistical theory of heavy nuclei. Other papers in Part II deal in detail with various problems in nuclear physics, such as the fission of heavy atoms and their isotopes, and with the study of cosmic radiation by means of artificial earth satellites and rockets, described in a paper by S.N. Vernov. The Russian-language edition of the proceedings of

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Reports of Soviet Scientists; Nuclear (Cont.)   SOV/2081

the conference is published in 16 volumes. The first 6 volumes contain all the
papers presented by Soviet scientists as follows: Volume (1), Yadernoya
fizika (Nuclear Physics); Volume (2), Yadernyye neaktory i yadernaya energetika
(Nuclear Reactor and Nuclear Power); Volume (3), Yadernoye goryucheye metally
(Nuclear Fuel and Reactor Metals), Volume (4), Khimiya radioelementov i radi-
atsionnykh prevrashcheniy (Chemistry of Radioelements and of Radiation Trans-
formations); Volume 5, Radiobiologiya i radiatsionnaya meditsina (Radiobiology
and Radiation Medicine); Volume (6) Polucheniye i primeneniye izotopov (Pro-
duction and Use of Isotopes). The other 10 volumes contain selected papers
presented at the Conference by non-Soviet scientists. In the present volume
discrepancies between the English and Russian language} edition of the proceed-
ings have been noted in three articles where the texts are not identical;
viz; Andrianov, et al, "High Current Pulsed Discharge"; Akhiyezer, et al,
"High Frequency Plasma Oscillation"; and Bogolyubov, "Investigations of the Many-
body Problem". The serial numbers of reports 2302 and 2504 are reversed in the
English edition. Report 2211, by Sinelnikov, et al, is numbered 2536 in the
English edition.

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Bogolyubov, N.N. Investigations of the Many-body Problem and Their Application to the Theory of Nuclear Matter (Report 2249)   245
   Personalities mentioned include V.V. Tolmachev, D.V. Shirokov, and S.V. Tyablikov.

Veksler, V.I. Startup of a 10-Bev Synchrophasotron and First Results of Physical Research   253
   Personalities mentioned include physicists M.Ya. Danysz (Poland), V.B. Lyubimov, and M.I. Podgoretskiy, of the Ob'yedinennyy institut yadernykh issledovaniy (United Institute of Nuclear Studies), K.D. Tolstov, E.N. Tsyganov, Wang Kang-ch'ang, M. Solov'yev, V.A. Petukhov, I.V. Chuvilo, A.G. Zel'dovich, I.N. Senenyushkin, N.I. Pavlov, L.P. Zinov'yev, K.V. Chekhlov, Wang Shu-fen, E. Kats (Rumania) P.K. Markov (Bulgaria), Wi Chun-wop (Korean People's Republic), and F. Brand (Czechoslovakia).

Card 7/29

VEKSLER, V. I.

   "Shook Coherent Acceleration."

report presented at the CERN Conference on High Energy Accelerators and Instrumentation,
14-19 Sept 1959 , Geneva.   (IUPAP)

VEKSLER, V. I.

21(0)

SOV/89-6-4-16/27

AUTHOR: Parkhit'ko, V.

TITLE: The Fifth Session of the Scientific Council of the Joint
              Institute of Nuclear Research (Pyataya sessiya Uchenogo soveta
              Ob"yedinennogo instituta yadernykh issledovaniy)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 4, p 479 (USSR)

ABSTRACT: The fifth session of the Scientific Council of the Ob"yedinennyy
              institut yadernykh issledovaniy (Joint Institute of Nuclear
              Research) was held from January 14 to 17, 1959. Lectures were
              held on the following important papers, which were also dis-
              cussed: Professor V. P. Dzhelepov spoke about the results
              obtained by the work carried out by the Laboratoriya yadernykh
              problem (Laboratory   of Nuclear Research). Investigations
              were carried out of: the elastic and inelastic scattering of
              nucleons on polarized and non-polarized particles, scattering
              of π-mesons on nucleons, processes of weak interaction in
              the presence of μ-mesons, and the properties of μ-mesons.
              The Director of the Laboratoriya teoreticheskoy fiziki
              (Laboratory for Theoretical Physics) Academician N. N.
              Bogolyubov, reported that the following subjects were in-
              vestigated: general scattering theory, field theory, theory

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SOV/89-6-4-16/27

The Fifth Session of the Scientific Council of the Joint Institute of Nuclear
Research

of elementary particles, nucleon structure, dispersion rela-
tions, use of the theory of superconductivity in investiga-
tions of nuclear matter. Academician V. I. Veksler reported
on the work carried out by the Laboratory for High Particle
Energies. A considerable amount of work was carried out for
the purpose of fixing the normal operational conditions for
the 10 Bev synchrophasotron in order to be able, above all,
to work day and night with this device. Moreover, a number
of new physical devices was developed. The Scientific Council
praised the work performed by this laboratory. The results ob-
tained by the most important work carried out by these 3
laboratories were outlined at the 2. Geneva Atomic Conference.
I. M. Frank, Corresponding Member, AS USSR and Holder of
the Nobel Prize, spoke about the progress made in building
the impulse reactor at the Laboratoriya neytronnoy fiziki
(Neutron-Physics Laboratory). This reactor differs essential-
ly from a normal reactor and is especially well suited for
work to be carried out in the field of neutron physics.
G. N. Flerov, Corresponding Member, AS USSR, gave a report

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SOV/89-6-4-16/27

The Fifth Session of the Scientific Council of the Joint Institute of
Nuclear Research

about nuclear reactions with highly ionized particles. Work
was carried out jointly by the USSR and the participating
countries in the Laboratory of Nuclear Physics. The Scientific
Council approved and confirmed the scientific building plans
for 1959. The management of the Institute submitted a plan
for the improvement of collaboration among the participants.
The Scientific Council expressed its gratitude especially
to the following persons: D. I. Blokhintsev, Director of the
Institute, Corresponding Member, AS USSR; Vaclav Votruba,
Deputy Director and Corresponding Member of the Czechoslovakian
Academy of Sciences, and Professor Marian Danycz (Poland),
Deputy Director.

Card 3/3

VEKSLER, Vladimir I.

"Elastic and Inelastic Nucleon-Nucleon Interaction at 3 to 9 Bev "

papers presented at the Intl Conference on High Energy Physics, Rochester, N.Y.
and/or Berkly California, 25 Aug - 16 Sep 1960.

Joint Institute for Nuclear Reserch, Dubna, USSR

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S/056/60/038/004/048/048
B006/B056

24.6900

AUTHORS: Van Gan-chan, Van Tsu-tszen, Veksler, V. I., Viryanov, N.M., Vrana, I., Din Da-tsao, Im Khi In, Kladnitskaya, Ye. N., Kuznetsov, A. A., Mikhul, A., Nguyen Din Ty, Nikitin, .. V., Solov'yev, M. I.

TITLE: Production of a Ξ^--Hyperon by Negative π^--Mesons With a Momentum of 8.3 Bev/c

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 4, pp. 1356 - 1359

TEXT: In the present "Letter to the Editor", the authors give a detailed report on the case of a Ξ^--production and decay discovered by them for the first time among 40,000 bubble-chamber photographs. The chamber happened to be in a 13,700-oe magnetic field. The photograph concerned is represented as well as the track scheme. The tracks are numbered, and the individual stars are denoted as "point A, B, 0, ..". The exact data of the tracks and stars, respectively, are given in tables (Table 1: "Kinematics at point A"; Table 2: "Kinematics at point B"; Table 3:

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Production of a $\bar{\Sigma}^-$-Hyperon by Negative
π^--Mesons With a Momentum of 8.3 Bev/c

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B006/B056

"Kinematics at point O"; and Table 4: "Kinematics at points O' and O" ").
The individual tracks are identified, and the charges and momenta (measured and calculated) of the particles, the kinetic and mass energies, and the total energy are given. For the stars B and O also the energy balance is given. For B, the following is considered to be the most probable reaction: $\bar{n} + C \rightarrow He_2^4 + 4p + 3n + \pi^+ + \pi^- + n\pi^0$. For the primary star (Tables 3 and 4) the following reaction is assumed:

$\pi^- + C \rightarrow \bar{\Sigma}^- + K^0 + \bar{K}^0 + K^- + p + \pi^+ + \pi^- + $ recoil nucleus. The lifetime of the $\bar{\Sigma}^-$-hyperon was calculated to be $(1.18\pm0.07).10^{-10}$sec. G.A. Blinov and S. Z. Otvinovskiy are mentioned. There are 2 figures, 4 tables, and 4 references: 3 Soviet and 1 US.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
              Institute of Nuclear Research)

SUBMITTED: March 24, 1960

Card 2/2

$\lambda 4.6900$

AUTHORS: Van Gan-chan, Van Tsu-tszen, Veksler, V. I., Vrana, I.,
Din Da-tsao, Ivanov, V. G., Kim Khi In, Kladnitskaya, Ye.N.,
Kuznetsov, A. A., Nguyen Din Ty, Nikitin, A. V., Solov'yev,
M. I., Khofmokl', T., Chen Lin-yan'

TITLE: Non-conservation of Parity in Strong Interaction Involving
Strange Particles

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 6(12), pp. 1854-1856

TEXT: The authors wanted to obtain an experimental proof for the non-conservation of parity in strong interaction. The proof suggested by Solov'yev for the longitudinal polarization of a Λ^c hyperon produced in nuclear collisions served as experimentum crucis. A number of experiments at low and medium energies failed. This "Letter to the Editor" presents the preliminary results of experiments with nuclear collisions and high energies. An analysis has been made of the angular asymmetries in decays of Λ^0 hyperons produced in π^-p collisions at 7-8 Bev. A total of

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88469

Non-conservation of Parity in Strong   S/056/60/039/006/062/063
Interaction Involving Strange Particles   B006/B063

34,000 photographs were taken, 14,000 at 6.8 Bev/c and 20,000 at ~8 Bev/c.
Altogether, 175 Λ^o and 33 Λ^o or K^o particles were detected; the systema-
tic error in the 208 events was $\pm$ 6 particles. The asymmetry in the Λ^o
decay was studied in the coordinate system shown in the accompanying
figure. The asymmetry in the ξ^* angular distribution is the up-down asym-
metry $(\alpha\bar{P}_3)$, that of θ_+^* is the forward-backward asymmetry $(\alpha\bar{P}_1)$, and that
of ψ^* is the right-left asymmetry $(\alpha\bar{P}_2)$. $\alpha\bar{P}_1$ was calculated from the

formula $\alpha\bar{P}_1 = \frac{3}{N} \sum_{i=1}^{N} \cos\theta_i^* \pm \sqrt{3 \left[1 - (\alpha\bar{P})^2\right]} / N$, where α is the asymmetry
factor of the Λ^o hyperons in the case of total polarization $(\bar{P} = 1)$;
$\bar{P}_1$ is the mean polarization of Λ^o; θ^* is the angle between the Λ^o decay
proton and the direction of motion of the Λ^o particle. The other
asymmetries were calculated analogously. Results are collected in Table 2.
Right-left and up-down asymmetries were not observed. The forward-
backward asymmetry obtained may indicate the non-conservation of parity in
strong interaction for strange particle production; however, the present
stage of investigation does not exclude all errors. The investigations

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88469

Non-conservation of Parity in Strong   S/056/60/039/006/062/063
Interaction Involving Strange Particles   B006/B063

are being continued. There are 1 figure, 2 tables, and 8 references:
3 Soviet and 5 US.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
             Institute of Nuclear Research)

SUBMITTED: September 1, 1960

Таблица 2

p_{Λ^0}	N	aP_1	aP_2	aP_3
$400 < p_{\Lambda^0} < 1200$	104	$-0,58 \pm 0,15$	$0,00 \pm 0,17$	$0,03 \pm 0,17$
	$104 + (4)$	$-0,50 \mp 0,15$	$0,06 \pm 0,16$	$0,07 \pm 0,16$
	$104 + (4) + (6)$	$-0,37 \pm 0,15$		
$p_{\Lambda^0} > 1200$	68	$-0,66 \pm 0,19$	$0,14 \pm 0,21$	$0,24 \pm 0,21$
	$68 + (29)$	$-0,09 \pm 0,17$	$0,06 \pm 0,17$	$0,21 \pm 0,17$
Все p_{Λ^0}	172	$-0,61 \pm 0,12$	$0,05 \pm 0,13$	$0,11 \pm 0,13$
	$172 + (33)$	$-0,31 \pm 0,12$	$0,00 \pm 0,12$	$0,12 \pm 0,12$
	$172 + (33) + (6)$	$-0,24 \pm 0,12$		
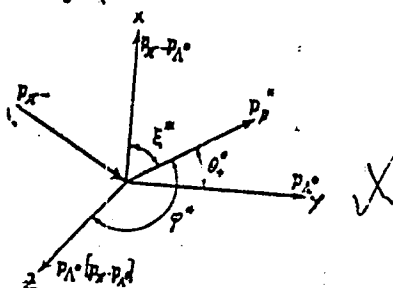
Card 3/3

Veksler, V. I.

AUTHORS: Lebedev, R., Smorodinskiy, Ye.,   S/053/60/070/02/009/016
Tyapkin, A.   B006/B007

TITLE: The Physics of Elementary Particles

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol 70, Nr 2, pp 361-374 (USSR)

ABSTRACT: The authors give a report on the International Conference on High Energy Physics held at Kiyev in July 1959.
D. I. Blokhintsev and I. Ye. Tamm. Two of the seven holders of the Nobel Prize represented were Russians: I. Ye. Tamm and P. A. Cherenkov. Apart from the surveying lectures seminars were held, in which the following Russian lecturers spoke: I. Ye. Tamm on "Diagram Technique and Field Theory", D. D. Ivanenko on the "Nonlinear Field- and Gravitation Theory", V. P. Dshelepov on "Nucleon-Nucleon Collisions", and I. V. Chuvilo on "Bubble Chambers". The plenary sessions began on July 20. In the first session Bernardini (CERN) spoke. His scientific secretaries were A. Baldin and A. Belousov (Moscow). The report on the lecture mentions the data obtained at the Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute imeni P. N. Lebedev AS USSR) on the "Polarisability of Protons in (pp)-Collisions". B. Pontecorvo (Dubna) delivered a lecture, which is discussed here in detail, on "Pion Scattering by Nucleons and Production of Single Pions in Nucleon-Nucleon and Pion-Nucleon Interactions". Next, V. I. Veksler (Dubna) spoke about "Nucleon-Nucleon and Pion-Nucleon Interactions in the 1.5 - 10 Bev Range"

VEKSLER, V.I.; VRANA, I.; KLADNITSKAYA, Ye.N.; KUZNETSOV, A.A.; MIHUL, A.K.;
MIHUL, Ye.K.; NGUYEN DINH TU; PENEV, V.N.; SOLOV'YEV, M.I.; HOFMOKI,T.;
CHEN-LING-YEN.

On strange particle production in π^- p interaction. Dubna,
Izdatel'skii otdel Ob"edinennogo in-ta iadernykh issledovanii, 1961.
9 p.

(No subject heading)

VEKSLER, V. I

PHASE I BOOK EXPLOITATION   SOV/5982

International Conference on High-Energy Physics. 9th, Kiyev, 1959.

Devyataya mezhdunarodnaya konferentsiya po fizike vysokikh energiy, Kiyev
15-25 iyulya 1959 g. (Ninth International Conference on High-Energy
Physics. Kiyev, July 15-25, 1959), Moscow, 1961. 739 p. 2,500 copies
printed.

Sponsoring Agency: Akademiya nauk SSSR. Mezhdunarodnyy Soyuz chistoy i
    prikladnoy fiziki.

Contributors not mentioned.

PURPOSE: This book is intended for nuclear physicists.

COVERAGE: The collection contains 30 scientific articles presented at the 9th
    International Conference on High-Energy Physics, held in Kiyev from 15 to
    25 July 1959. The articles presented relate mainly to the progress in nu-
    clear physics achieved in 1959. Subjects discussed are the production of

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Ninth International Conference (Cont.)   SOV/5982

nucleons, their structure, weak and strong interactions, scattering, and
their decay. No personalities are mentioned. References accompany indi-
vidual articles.

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Ninth International Conference (Cont.)   SOV/5982

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VEKSLER, V. I.

S/056/61/040/002/012/047
B102/B202

AUTHORS: Wang Kang-ch'ang, Wang Ts'u-tseng, Veksler, V. I., Vrana, I.,
             Ting Ta-ts'ao, Invanov, V. G., Kladnitskaya, Ye. N.,
             Kuznetsov, A. A., Nguyen Din Ty, Nikitin, A. V., Solov'yev,
             M. I., Ch'eng Ling-yen

TITLE: Production of $\Lambda^0(\Sigma^0)$ hyperons and K^0 mesons in π^-p interac-
             tions with a π^- meson momentum of 6.8 $\pm$0.6 Bev/c

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40,
             no. 2, 1961, 464-474

TEXT: The $\Lambda^0(\Sigma^0)$ and K^0 production in π^-p collisions has hitherto been
studied only for threshold momenta of (0.9 - 1.4) Bev/c; to explain the
nucleon structure and the interaction, studies must be made at higher ener-
gies. The studies described were made with a 24-liter propane bubble cham-
ber and a constant magnetic field of 13,700 oe. The experiment is described
in Ref. 2 (ZhETF, 38, 426, 1960). The pictures were taken with a stereo-
photocamera with "Russarplazmat" objectives (focal length 67 mm). The pic-
tures were evaluated 2 or 3 times with stereo-magnifiers and reprojectors.

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Production of ...

In this case, efficiency was 91 and 96%. Λ^0 and K^0 particles were selected according to rigorous rules. Altogether, 233 events conforming to these criteria were observed: space coordinates, angles, and momenta of these events were calculated by the electronic computer "Ural". The values obtained were geometrically corrected (consideration of the observation probabilities for Λ^0 and K^0 decays in the chamber volume as well as for Λ^0 and K^0 production). The number of events, in which 0, 2, 4, or 6 charged particles were observed besides K^0 and/or Λ^0 particles are given in Table 1. The mean number of charged particles accompanying a Λ^0 or K^0 production was 2.5±0.1; also $K^{\pm}$ mesons were observed among these charged particles. The neutral particles recorded were produced in the reactions

$$\pi^- + p \to \Lambda^0 + K^0 + n\pi \quad (1)$$

$$\pi^- + p \to \Sigma^0 + K^0 + n\pi \quad (2)$$

$$\pi^- + p \to \Lambda^0 + K^+ + n\pi$$

$$\pi^- + p \to \Sigma^0 + K^+ + n\pi$$

$$\pi^- + p \to K^0 + \bar{K}^0 + N + n\pi$$

$$\pi^- + p \to K^0 + K^- + N + n\pi$$

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$$\pi^- + p \to \bar{K}^0 + K^+ + N + n\pi$$

S/056/61/040/002/012/047
B102/B202

Production of ...

$\sigma (Y^0 K^0) = \sigma (1) + \sigma (2)$, $\sigma (Y^0 K^+) = \sigma (3) + \sigma (4)$, also the reactions

$\sigma (K^0 \overline{K}^0) = \sigma (5)$, $\sigma (K^0 K^-) = \sigma (6)$, $\sigma (\overline{K}^0 K^+) = \sigma (7)$

$$\pi^- + p \rightarrow \Sigma^\pm + K^0 + n\pi \qquad (8,9)$$

$\sigma (Y^0 K^{0,+}) = \sigma (Y^0 K^0) + \sigma (Y^0 K^+)$,

$$\pi^- + p \rightarrow \Xi^- + K^0 + K^+ + n\pi \qquad (10)$$

$\sigma (K^0, \overline{K}) = \sigma (K^0 \overline{K}^0) + \sigma (K^0 K^-) + \sigma (\overline{K}^0 K^+)$.

$$\pi^- + p \rightarrow \Xi^0 + K^0 + K^0 + n\pi \qquad (11)$$

were possible. In the following, the reactions are referred to only by these figures; the cross sections are indicated by (I). The total cross section of $\Lambda^0 (\Sigma^0)$ and K^0 production on free protons was found to be 2.0 ± 0.35 mb taking account of all corrections, including the π^- admixture and the efficiency of observation. In this case, $\sigma(Y^0 K^{0,+}) = 0.8 \pm 0.25$ mb, $\sigma(K^0 \overline{K}) = 1.2 \pm 0.3$ mb, $R = \sigma(Y^0 K^{0,+})/\sigma(K^0 \overline{K})$ $= 0.7 \pm 0.2$. Momentum and angular distributions are illustrated in several diagrams. The mean transverse momenta of Λ^0 and K^0 particles, 538 ± 35 and 393 ± 35 Mev/c, respectively, were equal within the limits of measurement errors. $Y^0 K^{0,+}$ - and $K^0 \overline{K}$ pair production cross sections: The experimental results indicate that at π^- energies of 9 Bev, the $K^0 \overline{K}$ pair production cross section is higher than that of $Y^0 K^{0,+}$. The ratio reads

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Production of ...

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$$R = \frac{\sigma(Y^\circ K^\circ) + \sigma(Y^\circ K^+)}{\sigma(K^\circ \bar{K}^\circ) + \sigma(K^\circ K^-) + \sigma(\bar{K}^\circ K^+)} = 0.7 \pm 0.2.$$

The authors only studied $K^\circ \bar{K}^\circ$, $K^\circ K^-$, and $\bar{K}^\circ K^+$, and obtained

$$R = \frac{\sigma(Y^\circ K^\circ) + \sigma(Y^\circ K^+)}{\sigma(K^\circ \bar{K}^\circ) + \sigma(K^\circ K^-) + \sigma(\bar{K}^\circ K^+) + \sigma(K^+ K^-)} = 0.5 \pm 0.15.$$

Near the production threshold (0.96 Bev), $\sigma(Y^\circ K^\circ) = 1.1$ mb; it drops to 0.4 mb at 1.2 Bev, and increases again to 0.6 mb at 1.3 Bev. The ratio $\sigma(Y^\circ K)/\sigma(K^\circ \bar{K})$ was experimentally determined to be 0.7; the theoretically obtained value (statistical theory) was 7.5. Mean multiplicity of charged particles: At 6.8 Bev, not only strange particles but also charged and uncharged particles were produced. In the case of multiple pion production, the mean number of charged particles was $\bar{n}_s = 3.2 \pm 0.2$, and in strange-particle production, $\bar{n}_g = 2.5 \pm 0.1$. Pions constitute the main part of charged particles. It can be concluded from the energy balance in a production event that the number of pions produced together with a strange particle is lower than in the case of ordinary multiple pion production. This is in

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S/056/61/040/002/012/047
B102/B202

Production of ...

agreement with the experimental results. The number of neutral pions ac-
companying strange-particle and normal multiple production is $2:3$. 0.5 ± 0.12
was obtained for n_K. Angular and momentum distributions: The experimental
results are illustrated in diagrams. In the center-of-mass system, the Λ
hyperons show a strong tendency to depart in backward direction
$(n_{forw.}/n_{backw.} = 1:5)$. This asymmetry was also observed in $\Lambda^0 K^0$ pair-
production events. Table 4 gives numerical data concerning the angular
distribution of Λ^0 and K^0 pairs in the c. m. s. Mesons produced together
with Λ^0 hyperons show a forward anisotropy at $n_s = 2$ $(n_{\pi-forw.}/n_{\pi-backw.}$
$=1.7\pm0.5)$. At higher values of n_s, this anisotropy is less distinct. Trans-
verse momenta: One of the most interesting results was that Λ^0 hyperons and
nucleons produced in inelastic collisions without strange-particle production
had the same distribution and the same mean transverse momenta which are
independent of multiplicity. The interaction radius in strange-particle pro-
duction can be estimated from the root-mean square transverse momenta. The
authors obtained $4 \cdot 10^{-14}$ cm. They thank D. I. Blokhintsev, M. A. Markov,
V. I. Ogiyevetskiy, Chou Kuang-chao, I. V. Chuvilo, V. S. Barashenkov, V. G.
Solov'yev for discussion. L. P. Zinov'yev, N. I. Pavlov, K. B. Chekhlov,

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Production of ....

S/056/61/040/002/012/047
B102/B202

L. N. Belyayev for help in the experimental work and T. Khofmoki and Kim Khu Inu for assistance in the verification of the results. N. G. Birger and V. Belyakov are mentioned. There are 7 figures, 4 tables, and 9 references: 4 Soviet-bloc and 5 non-Soviet-bloc. The two references to English-language publications read as follows: Ref. 3: D. Glaser, Ann. Intern. Conf. on High Energy Physics at CERN, Geneva 1958; Ref 6: G. Maenchen, W. Fowler, W. Powell, R. Wright, Phys. Rev. 108, 850. 1957.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: September 1, 1960

Fig. 1: Momentum distributions of Λ^0 hyperons in the c. m. s.; a) total spectrum, b) that of backward (solid line) and forward (dashed line) emitted Λ^0 hyperons.
Fig. 2: Λ^0 angular distribution in the c. m. s.; number of events given in parentheses.

Card 6/16

VEKSLER, V. I.

Coherent principle of acceleration of charged particles.
Dos. such. fiz. no.6:184-18 '62.   (MIRA 16:1)

(Particle accelerators)

POLYAKOV, V.A., WANG YUNG-CHANG, VEKSLER, V.I., VIRYASOV, N.M., VRANA, I., DU IHAN-TSAI, KIM HI IN, KLADNITSKAYA, Ye. N., KUZNETSOV, A.A., MIHUL, A. NGUYEN DING TI, I. PATERA, V. PENEV, SOKOLOVA, Ye. S., SOLOVYEV, M.I., HOFMOKL, T., and TSEN LIN-IAN

"The Investigation of Λ-Hyperon and K^0-Meson Production in $\bar{u}C$ and Interactions at 7-8 Gev"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research
Laboratory of High Energies

VEKSLER, V.I.

BELYAKOV, V.A., WANG YUNG-CHANG, VEKSLER, V.I., VIRYASOV, N.M., DU IUAN-TSAI, KIM HI IN, KLADNITSKAYA, Ye. N., KUZNETSOV, A.A., MIHUL, A., NGUEN, DIN TI, PEREV, V.N., SOKOLOVA, Ye. S., SOLOVEV, M. I.

"Study of ΛK and $K_1^0 \bar{K}^0$ Pair Production if $\pi^- p$ and $\pi \bar{e}$ Interactions at the 7.8 Gev/C Momentum of π^- Mesons"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research
Laboratory of High Energy Physics

VAN YU-CHAN [Wang Yung-ch'ang]; VEKSLER, V.I.; DU YUAN'-TSAY
[Tu Yuan-ts'ai]; KLADNITSKAYA, Ye.N.; KUZNETSOV, A.A.;
MIKHUL, A.; NGUYEN DIN TY; PENEV, V.N.; SOKOLOVA, Ye.S.;
SOLOV'YEV, M.I.; SARANTSEVA, V.R., tekhn. red.

[Generation of Λ K^o and $K^o K^o$ pairs in $\pi^- p$ interactions at π^--meson energies of 7-8 Bev/c.] Izuchenie rozhdeniia Λ K^o i $K^o K^o$ -par v $\pi^- p$ - vzaimodeistviiakh pri impul'se π^--mezona 7-8 Bev/s. Dubna, Ob"edinennyi in-t iadernykh issledovanii, 1962. 15 p.

(MIRA 15:6)

1. Institut Atomnoy fiziki, Bukharest.(for Mikhul).
      (Mesons)   (Nuclear reactions)

VEKSLER, V.I.; VIRYASOV, N.M.; VRANA, I.; KIM KH IN; KLADNITSKAYA,
        Ye.N.; KUZNETSOV, A.A.; NGUYEN DIN TY; SOLOV'YEV, M.I.;
        KHOFMCKL', T.; CHEN LIN-YAN'; SARANTSEVA, V.R., tekhn. red.

[Polarization of Λ -hyperons produced in π^- -p-interac-
tions at an energy of 7-8 Bev]Izuchenie poliarizatsii Λ
-giperonov pri rozhdenii v π^- -p-vzaimodeistviiakh s ener-
giei 7-8 Bev. Dubna, Ob"edinennyi in-t iadernykh issl.,
1962. 23 p.   (MIRA 15:10)
    (Hyperons—Decay) (Mesons—Decay) (Protons)

S/056/62/043/003/013/063
B102/B104

AUTHORS: Wang Yung-chang, Veksler, V. I., Tu Yüan-ts'ai, Kladnitskaya, Ye. N., Kuznetsov, A. A., Mikhul, A., Nguyen Din Ty, Penev, V. N., Sokolova, Ye. S. Solov'yev, M. I.

TITLE: Investigation of ΛK^0 and $K^0 \overline{K^0}$ pair production in $\pi^- p$ inter- actions with π^- meson momentum of 7-8 Bev/c

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 3(9), 1962, 815-822

TEXT: Pair production events, including 52 $(\Lambda + K^0)$, 37 $(K^0 + \overline{K^0})$, 16 either $(\Lambda + K^0)$ or $(\overline{K^0} + K^0)$ and two $(\Lambda + K^0 + \overline{K^0})$ were observed among 60,000 photographs made with a 24-liter propane bubble chamber. The momentum and angular distributions of the π^+, Λ and K^0 particles were determined. Also the distribution of

$$Q = [2 (E_{\Lambda(K)}E_K - P_{\Lambda(K)}P_K \cos \theta_{\Lambda(K), K}) + m_{\Lambda(K)}^2 + m_K^2]^{1/2} - m_{\Lambda(K)} - m_K \quad (1)$$

(P - momenta)

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Investigation of ΛK^o and...

S/056/62/043/003/013/063
B102/B104

was studied and the results obtained were confronted with the theoretical curves (Monte Carlo method). Results: The mean K^o momentum from ΛK^o pairs was 702 ± 54 Mev/c, from $K^o\overline{K^o}$ pairs 604 ± 55 Mev/c. In the $\pi^- p$ c.m. in $(55 \pm 9)\%$ of the events the Λ particles from ΛK^o pairs flew backward and those from the K^o forward. In $(33 \pm 7)\%$ they both flew backward. In $(12 \pm 4)\%$ they both flew forward or the Λ forward and the Λ backward (this distribution indicates a contribution of peripheral interaction). The Λ-hyperon distribution has a peak at $-1 \leqslant \cos\theta_\Lambda \leqslant -0.8$.

For the $K^o\overline{K^o}$ pairs a maximum in the K^odistribution was observed at $+0.6 \leqslant \cos\theta_{K^o} \leqslant +1.$ In $(47 \pm 12)\%$ of the cases the both K^o mesons flew in opposite directions, in $(25 \pm 7)\%$ both flew backward and in $(28 \pm 8)\%$ both forward. From the angular distribution it can be concluded that in $K^o\overline{K^o}$ pair production besides the S-wave states with higher l will exist. The Q-distribution for these pairs has a maximum in the range 50-150 Mev/c. There are 14 figures.

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Investigation of ΛK^0 and...   S/056/62/043/003/013/063
B102/B104.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
Institute of Nuclear Research). Institute of Atomic
Physics, Bucharest (A. Mikhul)

SUBMITTED: April 11, 1962

Card 3/3

BELYKOV, V.A.; VAN YUN-CHAN [Wang Yung-ch'ang]; VEKSLER, V.I.; VIRYASOV, N.M.;
    DU YUAN'-TSAY [Tu Yüan-ts'ai]; KIM KHI IN; KLADNITSKAYA, Ye.N.;
    KUZNETSOV, A.A.; NGUYEN DIN TY; PENEV, V.N.; SOLOV'YEV, M.I.

Polarization of Λ-hperons produced in π^-C-interactions at 7 Bev.
Zhur. eksp. i teor. fiz. 45 no.2:90-92 Ag '63.   (MIRA 16:9)

1. Ob"yedinennyy institut yadernykh issledovaniy.
                    (Nuclear reactions) (Hyperons)

BELYAKOV, V.A.; BOYADZHIYEV, A.V.; VAN YUN-CHAN[Wang Yung-ch'ang];
    VEKSLER, V.I.; VIRYASOV, N.M.; KIM KHI IN; KLADNITSKAYA,
    Ye.N.; KUZNETSOV, A.A.; MAL'TSEV, V.M.; NGUYEN, DIN TY;
    PENEV, V.N.; SOLOV'YEV, M.I.; ZRELOVA, N.N., tekhn. red.

[Production of $\Lambda(\Sigma^\circ)$-hyperons and K°-mesons in the inter-
action of 7 Gev. π^--mesons with carbon] Rozhdenie $\Lambda(\Sigma^\circ)$-
giperonov i K°-mezonov pri vzaimodeistvii π^--mezonov s
energiei 7 Gev s uglerodom. Dubna, Ob"edinennyi in-t iader-
nykh issledovanii, 1963. 18 p.   (MIRA 17:2)

S/056/63/044/001/017/067
B108/B180

AUTHORS: Veksler, V. I., Viryasov, N. M., Vrana, I., Kim Khi Im,
              Kladnitskaya, Ye. N., Kuznetsov, A. A., Nguyen Din Ty,
              Solov'yev, M. I., Khofmokl', T., Chen Ling-yen

TITLE: The polarization of Λ-hyperons produced in π⁻p-interactions
              at an energy of 7 - 8 Bev

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44,
              no. 1, 1963, 84 - 99

TEXT: 60000 photographs were examined of the interaction of π^--mesons of
7 - 8 Bev/c with protons in a 24-liter propane bubble chamber in a
permanent magnetic field of 13,700 oe. Method and apparatus have already
been described (Wang Kang-ch'ang, M. I. Solov'yev, Yu. N. Shkobin. PTE, 1,
41, 1959; M. I. Solov'yev, Proc. of the 1960 Ann. Int. Conf. on High
Energy Physics at Rochester, p. 388; Wang Kang-ch'ang et al. ZhETF, 39,
1854, 1960). The Λ-hyperons were unpolarized during their production.
This follows from the fact that there is no asymmetry in the angular dis-
tributions of the protons from the decay of the Λ-hyperons relative to
the hyperon momentum. The angular distributions of the Λ-hyperon produc-
Card 1/2

The polarization of Λ -hyperons ...   S/056/63/044/001/017/067
B108/B180

tion planes relative to the production planes of the K-mesons and pions
are nearly isotropic. The results agree with the law of conservation of
parity in strong interactions involving strange particles. There are
13 figures and 4 tables.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
Institute of Nuclear Research)

SUBMITTED: July 31, 1962

Card 2/2

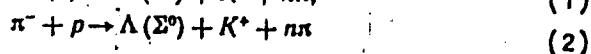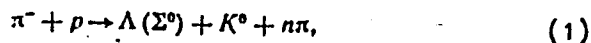8/056/63/044/002/007/065
B102/B186

AUTHORS: Belyakov, V. A., Wang Yung Ch'ang, Veksler, V. I.,
             Viryasov, N. M., Vrana, I., Tu Yüan-ts'ai, Kim Khi Ying,
             Kladnitskaya, Ye. N., Kuznetsov, A. A., Mikhul, E. Nguyen
             Din Ty, Patera, I., Penev, V. N., Sokolova, Ye. S.,
             Solov'yev, M. I., Khofmokl', T., Cheng Ling-yen, Mikhul, A.

TITLE: Investigation of Λ-hyperon and K^0-meson production
             processes in π^-p interactions at 7-8 Bev

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44,
             no. 2, 1963, 431-443

TEXT: The c.m.s. momentum and angular distributions determined for the
Λ and K^0 particles produced in πp interactions are given and discussed.
The measurements were made using a 24-liter propane bubble chamber in a
field of 13,700 oe. The total momentum spectrum of the Λ-hyperons
produced in the reactions

$$\pi^- + p \rightarrow \Lambda(\Sigma^0) + K^0 + n\pi, \qquad (1)$$
$$\pi^- + p \rightarrow \Lambda(\Sigma^0) + K^+ + n\pi \qquad (2)$$

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Investigation of Λ-hyperon ...   S/056/63/044/002/007/065
B102/B186

are shown in Fig. 1, compared with theoretical results. As it may be seen the statistical theory describes the experimental curve very well if the isobars and, the cases with p_p-p = Δ<700 Mev are neglected.

Δ < 700 Mev corresponds to ~30% of all Λ, these being produced in peripheral interactions. The Λ angular distribution has a distinct backward peak ($\vec{n}_\Lambda/\bar{n}_\Lambda$ = 0.18 $\pm$ 0.02). With increasing multiplicity n_s the agreement between experiment and statistical theory improves. The Λ angular distribution and the distribution with respect to $p_\perp$ is virtually independent of n_s. The overall mean of the transverse momentum is 383 $\pm$ 12 Mev/c; for Δ < 700 Mev, $\overrightarrow{p}_{\Lambda_\perp}$ = 295 $\pm$ 14 Mev/c and for $\Delta \geqslant$ 700 Mev, $\overline{p}_{\Lambda_\perp}$ = 432 $\pm$ 18 Mev/c. For the $K^0(\bar{K}^0)$ mesons produced in the reactions

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Investigation of Λ-hyperon ...

S/056/63/044/002/007/065
B102/B186

$$\pi^- + p \to \begin{cases} K^0 + \Lambda\,(\Sigma^0) + n\pi, & (1) \\ K^0 + \overline{K}^0 + N + n\pi, & (3) \\ K^0 + K^- + N + \pi n, & (4) \\ \overline{K}^0 + K^+ + N + n\pi, & (5) \\ K^0 + \Sigma^{\pm} + n\pi. & (6) \end{cases}$$

the total momentum spectrum measured (Fig. 4) is weaker than that calculated according to the statistical theory. The angular distribution (Fig. 5) has, besides the isotropic part, a forward peak ($\vec{n}_{K^0} / \overleftarrow{n}_{K^0} = 1.61 \pm 0.15$). The forward-backward ratio decreases with increasing n_s. For the charged pions arising in Λ-production events the momentum distributions are, for $p_\pi^+ \geqslant 400$ Mev/c, well described by the statistical theory without taking the isobars into account; for $p_\pi^* < 400$ Mev/c it is higher than that obtained from theory. The angular distributions for $n_s = 2, 4, 6$ are characterized by

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Investigation of Λ-hyperon ...

S/056/63/044/C02/007/065
B102/B186

$$\vec{n}_{\pi^+}/\bar{n}_{\pi^+} = 1.10 \pm 0.12, \qquad \vec{n}_{\pi^-}/\bar{n}_{\pi^-} = 1.40 \pm 0.13.$$

The mean number of π^0 mesons produced per $\pi^- p$ interaction with Λ production is 1.23 ± 0.14. The angular distribution of π^- arising in stars with K^0 production has a flat forward maximum ($\vec{n}_{\pi^-}/\bar{n}_{\pi^-} = 1.10 \pm 0.10$). The mean number of charged particles produced together with Λ is $n_s = 2.22 \pm 0.13$ which agrees closely with the statistical theory without the isobars. The main part of Λ and K^0 is produced in two-pronged stars. The admixture of $K^0 \Sigma^{\pm}$ pairs amounts to less than 20% of the number of $K^0 K^- + K^0 K^+$ pairs. The momentum distribution of charged pions from $\pi^- p$ interactions with Λ-hyperon production are characterized by $p^*_{\pi^+} = 425 \pm 16$ Mev/c and $\bar{p}^*_{\pi^-} = 444 \pm 15$ Mev/c. From a comparison of these angular distributions it is concluded that processes involving ΛK or $K\bar{K}$ pair production are more central than the usual processes of multiple pion production. If one divides the $\pi^- p$ interactions with strange particle production into head-on

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Investigation of Λ-hyperon ...

8/056/63/044/002/007/065
B102/B106

and peripheral collisions one can say that those involving $K\bar{K}$ pair production are rather of the head-on type than those with ΛK pair production. There are 15 figures and 2 tables.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: July 31, 1962

Fig. 1. Total momentum spectrum of hyperons; dashed line: without correction for recording probability; shaded area: events with $\Delta < 700$ Mev; curves obtained from statistical theory with (I) and without (II) isobars, and without the events with $\Delta < 700$ Mev (II').

Fig. 4. K^o total momentum spectrum.

Fig. 5. K^o total angular distribution.

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TITLE. Antilambda hyperon production by 7-8 GeV negative pions on hydrogen

SOURCE: Zhur. eksper. i teoret. ...

... ...

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and the transverse momentum of the decay products was less than or equal to 100
MeV. Selection of the Λ hyperons was by kenemativ criteria, measurement of
ionization, and determination of the δ-electron energy. The cross section for
the production of Λ hyperons is found not to differ much from the cross section
of NN production, or about 3 μb. Orig. art. has 1 figure and 1 table.

Card 1/2

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DATE ACQ   26Sep63

...ately   Joint Institute of

Card   2 2

L 3774-66   EWT(m)   DIAAP   GS

ACCESSION NR: AT5007949   S/0000/64/000/000/0788/0790

AUTHOR: Vagin, V. A.; Veksler, V. I.; Zubarev, V. M.; Kuznetsov, A. B.; Mukhin, S. V.; Petukhov, V. A.; Popov, V. A.; Rubin, N. B.; Stepanyuk, V. L.; Chekhlov, K. V.; Semenyushkin, I. N.

TITLE: Electrodynamic separator of antiprotons with 5 Gev/c momentum

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 788-790

TOPIC TAGS: high energy particle, antiproton, pion, particle interaction

ABSTRACT: The study of processes initiated by such particles as high-energy K-mesons and antiprotons is often determined by the possibility of separating these particles from an accompanying pi-meson background. The tremendous technical difficulties arising in the use of the electrostatic method of separation for obtaining pure beams of relativistic particles urgently dictate the necessity of seeking new means of separating particles. In 1956, V. I. Veksler and V. A. Petukhov proposed an electrodynamic method of separating particles according to masses. At the present time the high-energy laboratory of the Joint Institute of Nuclear Research is perfecting the application of an electrodynamic separator, creat-

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ACCESSION NR: AT5007949

ed on the basis of this method, of antiprotons with momentum up to 5 Gev/c. The present report discusses the principle governing the operation of the electrodynamic separator. At the end of the acceleration cycle in the synchrophasotron the protons are recaptured into the acceleration regime at a frequency of high multiplicity and are subsequently directed against a target. The beam of secondary particles which then occurs possesses a corresponding high-frequency structure. The negatively charged particles that interest us are extracted by the magnetic field of the accelerator to the outside. Further, as a result of magnetic analysis the particles are resolved in a narrow interval of momenta, or pulses. A longitudinal distribution of the resolved particles begins to take place over a certain distance of their flight. The antiprotons being heavier particles retire from the pi-mesons. If the total length L of flight, counted from the target (for the case of relativistic particles) is equal to

$$L \approx \frac{\lambda}{2\,(\beta_1 - \beta_2)}$$

where g is the operating wavelength of a multiple-acceleration system and β_1, β_2 are respectively the velocities of the pi-mesons and antiprotons in units of the speed of light, then the lag of the antiprotons is exactly equal to the half wavelength $\lambda/2$. On the path of the particles at this place there is created a high-frequency transverse electric field with the same wavelength λ which is rigidly bound in

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ACCESSION NR: AT5007949

phase with the voltage that is accelerating the beam at multiple frequency. In case
of a suitable choice of the phase of the electric field the antiprotons and the pi-
mesons will obtain angular deflections different in sign and can be spatially re-
solved further. The report discusses the composition of the electrodynamic separa-
tor of antiprotons at the high-energy laboratory, which consists of a multiple-
acceleration system, deflecting device, and an ion-optical system. Also discussed
are the separator's characteristics. The device can also be employed to resolve
pi-mesons and antiprotons with smaller values of momenta and to separate K-mesons,
if certain necessary conditions are fulfilled for the separation of antiprotons and
K-mesons respectively:

$$(pc)_{\bar{p}} \approx m_p c^2 \left[\frac{L}{(2n+1)\lambda} \right]^{1/2} ; \qquad (pc)_k \approx m_p c^2 \left[\frac{L}{(2n+2)\lambda} \right]^{1/2} .$$

where the momenta of the antiprotons and K-mesons are respectively $(pc)_{\bar{p}}$, $(pc)_k$,
and the rest-energy of an antiproton is $m_p c^2$, and $n = 0, 1, 2, \ldots$ Orig. art. has
3 figures.

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L 3774-66
ACCESSION NR: AT5007949

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy, Dubna (Joint Institute of Nuclear Research)

SUBMITTED: 26May64   ENCL: 03   SUB CODE: NP

NO REF SOV: 003   OTHER: 000

Card 4/4

BELYAKOV, V.A.; VAN YUN-CHAN [Wang Yung ch'ang]; VEKSLER, V.I.;
VIRYASOV, N.M.; VRANA, I.; DU YUAN'-TSAY [Tu Yuan ts'ai];
KIM KHI IN; KLADNITSKAYA, Ye.N.; KUZNETSOV, A.A.;
MIKHUL, E.; NGUYEN, DIN TY; PATERA, I.; PENEV, V.N.;
SOKOLOVA, Ye.S.; SOLOV'YEV, M.I.; KHOFMOKL', T.;
MIKHUL, A.

[Production of Λ-hyperons and K^0-mesons in π^-p-
interactions at an energy of 7-8 Bev] Issledovanie protses-
sov rozhdeniia Λ-giperonov i K^0-mezonov v π^-p- vzaimo-
deistviiakh pri energii 7-8 Bev. [n.p. n.d.] 26 p.
                                        (MIRA 16:10)

   (Mesons)   (Hyperons)

VEKSLER, V.I.; VIRYASOV, N.M.; VRANA, I.; KIM KHI IN; KLADNITSKAYA, Ye.N.;
KUZNETSOV, A.A.; NGUYEN DIN TY; SOLOV'YEV, M.I.; KHOPMOKL', T.;
CHEN LIN-YAN*

Polarization of Λ-hyperons produced in γ p-interactions at
an energy of 7 - 8 Bev. Zhur. eksp. i teor. fiz. 44 no.1:
84-99 Ja '63.   (MIRA 16:5)

1. Ob"yedinennyy institut yadernykh issledovaniy.
          (Hyperons)   (Mesons)   (Nuclear reactions)

VEKSLER, V.I.; PISAREV, V.Ye.; MOROZ, Ye.M.; RATNER, B.S.

The 30 Mev. synchrotron of the Physical Institute.   Trudy Fiz.
Inst. 19:98-150 '63.   (MIRA 16:8)

(Synchrotron)

L 4241-66   EWT(1)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2   IJP(c)   GS/AT

ACCESSION NR: AT5007972   S/0000/64/000/000/1017/1022

AUTHOR: Veksler, V. I.; Gekker, I. R.; Gol'ts, E. Ya.; Delone, G. A.; Kononov, B. P.; Kudrevatova, O. V.; Lyk'yanchikov, G. S.; Rabinovich, M. S.; Savchenko, M. S.; Sarksyan, K. A.; Sergeychev, K. V.; Silin, V. A.; Tsopp, L. E.; Levin, M. L.; Muratov, R. Z.

TITLE: Radiational acceleration of plasma

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 1017-1022

TOPIC TAGS: high energy accelerator, plasma acceleration, plasma waveguide

ABSTRACT: The practical realization of the radiational method of plasma accelera- tion (Veksler, V. I. CERN Symposium, 1956; Atomnaya energiya 2, 427, 1957) is con- nected with the utilization of a different kind of waveguide structure, within which a plasma bunch moves under acceleration by an electromagnetic field. Two such waveguide structures, differing in type of accelerating wave and in method of plasma injection, were produced recently in the Physics Institute, AN SSSR. Initial experiments showed that radiational acceleration of plasma was achieved in both of the structures. At the same time the Radiotechnical Institute, AN SSSR,

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L 4241-66

ACCESSION NR: AT5007972

carried out a theoretical study of the possibilities of the radiational method. The present report contains a brief exposition of all these investigations, under the two headings of: experimental results and theory of radiational acceleration. Both waveguide structures employed one and the same super high-frequency oscillator of 10 cm range which operated in the single- stage pulse regime of 8 microseconds duration; the average density of power flux through tube cross-section did not exceed $8 \cdot 10^3$ watts/cm^2, and the KSVN of the entire waveguide system (without plasma) was not worse than 1.3. The accelerating waveguides were tubes of circular cross-section with walls of noncorroding steel 1 mm thick; the vacuum in the tubes was of the order of 10^{-7} to 10^{-6} mm of mercury. The forces of the radiational pressure which act upon the plasma bunch are found by proceeding from the conservation laws. In the plane electromagnetic wave propagated in free space the density of pulse flux equals the average energy density. Orig. art. has: figures, 26 formulas.

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR); Radiotekhnicheskiy institut AN SSSR (Radio Engineering Institute, AN SSSR)

SUBMITTED: 26May64   ENCL: 00   SUB CODE: NP.
NO REF SOV: 008   OTHER: 003

Card 2/2

KOTOV, V.I., kand.fiz.-matem.nauk (Dubna); VEKSLER, V.I., akademik; VLADIMIRSKIY, V.V.; SETVAK, M., doktor (Chekhoslovakiya); MINTS, A.L., akademik; DZHE-LEPOV, V.P., prof.; VAL'TER, A.K., prof.; KOLOMENSKIY, A.A., prof.

Accelerators of the future; articles and speeches of the participants in the international conference in Dubno. Priroda 53 no.1:44-56 '64.

(MIRA 17:2)

1. Chlen-korrespondent AN SSSR (for Vladimirskiy).

ACCESSION NR: AP4036402 .   S/0030/64/000/004/0024/0028

AUTHOR: Veksler, V. I. (Academician)

TITLE: Division of nuclear physics (Report of Academician V. I. Veksler)

SOURCE: AN SSSR. V.stnik, no. 4, 1964, 24-28

TOPIC TAGS: elementary particle, atomic nucleus, cosmic ray, neutrino, resonance, nucleon, small angle scattering, mu·meson, capture, pion, lepton decomposition, lepton polarization

ABSTRACT: This report was presented by Academician V. I. Veksler at the general assembly of the Academy of Sciences USSR. It describes the state and development of nuclear physics in 1963. The author mentions the most important achievements in the study of elementary particles, the atomic nucleus, and cosmic rays. In the field of elementary particles the year was marked by the establishment of evidence proving the existence of two neutrino types, the discovery of new resonances, the study of small-angle scattering of nucleons, the capture of mu-mesons in helium, lepton decomposition of pions, and lepton polarization. An entirely new type of spontaneous fission was discovered, and the possibilities of this state of matter

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ACCESSION NR: AP4036402

were studied theoretically. Important results were obtained in the field of light nuclei and of charged ions. The extragalactic origin of cosmic particles with energies exceeding $10^{15} - 10^{16}$ ev was established, and a new technique for the study of the reaction of atomic nuclei with particle energies $10^{12} - 10^{13}$ ev was developed. Because further investigation along the above lines requires the construction of gigantic accelerators (100-1000 billion ev), a search for new acceleration principles and exploration of new techniques in accelerator design are suggested. A considerable progress in the design of a cybernetic accelerator was achieved by Radiotekhicheskiy institut Akademii nauk SSSR (Radiotechnical Institute, Academy of Sciences SSSR). Fizicheskiy Institut Komiteta po ispol'zovaniyu atomnoy energii (Physical Institute of the Atomic Energy Commission) started construction in Yerevan of an electronic (6 billion ev) synchrotron. Near the town of Serpukhov, the greatest proton synchrotron in the world is in the process of being built. Research at other institutes is also mentioned.

ASSOCIATION: none

SUBMITTED: 00   DATE ACQ: 20May64

Card   2/3   ENCL: 00

ACCESSION NR: AP4036402

SUB CODE: NP   NO REF SOV: 000   OTHER: 000

Card   3/3

ACCESSION NR: AP4042554   S/0056/64/046/006/1967/1978

AUTHORS: Balyakov, V. A.; Veksler, V. I.; Viryasov, N. M.; Kladnitskaya, Ye. N.; Kopy*lov, G. I.; Penev, V. N.; Sokolova, Ye. S.; Solov'yev, M. I.

TITLE: Pion resonances produced simultaneously with strange particles in negative pion proton interactions at 7.5 GeV/c

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 6, 1964, 1967-1973

TOPIC TAGS: pion, negative pi meson, strange particle, resonance scattering, omega meson, proton reaction

ABSTRACT: Continuing a series of earlier research on the generation of strange particles and pions in a beam of 7.5 GeV/c negative pions (ZhETF v. 43, 815, 1962; v. 44, 431 and 1474, 1963; Proc. 1960 Rochester Conf., 1961, p. 388), the authors investigated with the aid of 24-liter propane bubble chamber the pion resonances produced simul-

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ACCESSION NR: AP4042554

taneously with strange particles. Pion resonances produced in inter-
actions of the type.

$$
\pi^- + p \rightarrow
\begin{cases}
\Lambda(\Sigma^0) + K^0 + m\pi \\
\Lambda(\Sigma^0) + K^+ + m\pi \\
K^0 + \widetilde{K}^0 + p(n) + m\pi \\
K^0 + K^- + p(n) + m\pi \\
\widetilde{K}^0 + K^+ + p(n) + m\pi \\
K^0 + \Sigma^+ + m\pi \\
K^0 + \Sigma^- + m\pi
\end{cases}
$$

were investigated (m -- number of pions). Simultaneous production of
ρ^0 mesons and ΛK pairs was observed in events characterized by a
charged particle multiplicity $n_s = 4$ and having cross sections of
20 ± 8 microbarns. Cross sections for the production of ω and η re-
sonances are presented. It is concluded that the four-pion effective

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mass distribution has a peak at 1340 MeV and several possible reasons for this peak are suggested. "We are greatly indebted to M. I. Podgoretskii and I. V. Chuvilo for assistance and valuable discussion, to Tu Yuan-ts'ao, A. A. Kuznetsov, Kim Hi In, Nguyen Dinh Tu, and Wang Yung-ch'ang for participating in the first stage of the work, to N. N. Govorun and N. F. Markova of the computing center of OIYaI and to G. M. Korotkova, S. N. Komarova and L. M. Zhukova for measurements and calculations." Orig. art. has: 11 figures, 11 formulas', and 1 table.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research).

SUBMITTED: 30Dec63   DATE ACQ: ENCL: 00

SUB CODE: NP   NR REF SOV: 009'   OTHER: 012

Card   3/3

ACCESSION NR: AP4037568   S/0056/64/046/005/1586/1597

AUTHORS: Belyakov, V. A.; Boyadzhiyev, A. V.; Wang, Yung-ch'ang;
Veksler, V. I.; Viryasov, N. M.; Kim Khi In; Kladnitskaya, Ye. N.;
Kuznetsov, A. A.; Mal'tsev, V. M.; Nguyen Din Ty*; Penev, V. N.;
Solov'yev, M. I.

TITLE: Production of $\Lambda(\Sigma^0)$ hyperons and K^0 mesons in interaction
between 7 GeV negative pions and carbon

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 5, 1964, 1586-1597

TOPIC TAGS: Λ hyperon, Σ^0 hyperon, neutral kaon, negative pion
carbon interaction, hyperon production, kaon production, pion proton
interaction, bubble chamber, secondary interaction fraction, angular
distribution, momentum distribution, cascade model

ABSTRACT: The production of $\Lambda(\Sigma^0)$ hyperons and K^0 mesons by negative
pions on carbon was investigated and compared with earlier results

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ACCESSION NR: AP4037568

(ZhETF v. 40, 464, 1961) from π^-p interactions at the same pion mo-
mentum. A 24-liter propane bubble chamber in a constant field of
13,700 Oe was used in accordance with a procedure described before
(ZhETF, v. 38, 426, 1960). The purpose of the experiment was to
estimate the fraction of the secondary interactions. An estimate
was made for the first time of the fraction of strange particles
produced in the secondary processes. The momentum spectrum of the
Λ hyperons (in the pion-nucleon center of mass system) was compared
with the spectrum for the π^-p interactions. The following distribu-
tion of events over the reaction channels was obtained

	Y^0K^0	Y^0K^+	$K^0\overline{K^0}$	$K^0K^- + K^+\overline{K^0}$	$\Sigma^{\pm}K^0$	Y^0Y^0KK
Number of events	427±00	223±81	147±52	323±127	81±31⁽ⁿ⁾	4⁽ⁿ⁾
Cross section, mb	4,8±0,8	2,5±0,0	1,7±0,6	3,0±1,4	0,0±0,4	0,04

and the cross section for each interaction event with the carbon
was calculated to be 0.0113 mb. This yielded the following cross

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ACCESSION NR: AP4037568

sections

$$\sigma(Y^0 K^{0,+}) = 7.3 \pm 1.2 \quad \text{and} \quad \sigma(K^0 \bar{K}) = 5.3 \pm 1.5$$

The good agreement between the calculated and experimental values of the spectra of the Λ hyperons and K^0 mesons gives grounds for assuming that the cascade model holds true for these phenomena. It also is concluded that the previously observed hard part of the momentum spectrum of the Λ hyperons in the pion-nucleon center of mass system in $\pi^- p$ interactions is due to an admixture of carbon events, and that the role of the secondary processes which lead to the production of strange particles is quite appreciable even on the carbon nucleus. "The authors are grateful to I. Klugov and M. Shneyeberger for help at the beginning of the work, to V. S. Barashenkov, I. V. Chuvilo, and M. I. Podgoretskiy for discussion and valuable remarks, to Ye. P. Zhidkov, G. A. Ososkov, and K. N. Danilova for help with the calculations, and to the laboratory group for the measurements." Orig.

Card 3/6

ACCESSION NR: AP4037568

art. has: 5 figures, 7 formulas, and 1 table.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy
(Joint Institute of Nuclear Research)

SUBMITTED: 02Dec63

SUB CODE: PH

DATE ACQ: 09Jun64

NR REF SOV: 013

ENCL: 02

OTHER: 008

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ACCESSION NR: AP4037568

Particle type	Particle number	Particle type	Particle number
Λ	108	$\Lambda + \Lambda$	1
K^0	248	$K^0 + K^0 + \Lambda$	1
Λ ' K^0		$K^0 + (\Lambda$ ' $K^0)$	5
$\Lambda + K^0$	45	$\Lambda + (\Lambda$ ' $K^0)$	1
$K^0 + \bar{K}^0$	30	$\bar\Lambda$ или K^0	3
	0		

Distribution of events

Card 5/6
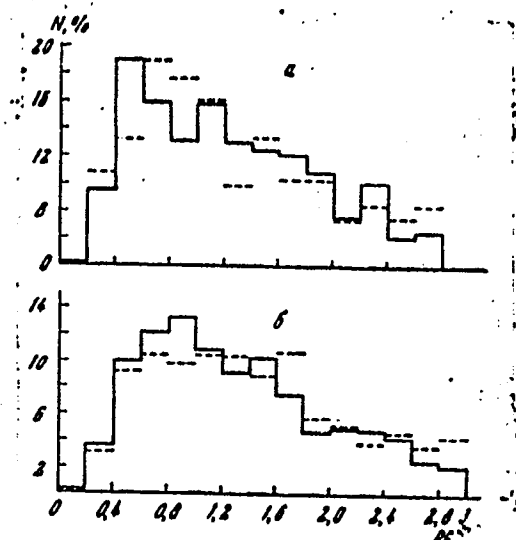
Momentum distribution of Lambda
hyperons (a) and kaons (b) from
pion-carbon interaction at 7 GeV/c
solid - experimental
dashed - Monte Carlo calculation

Card: 6/6

ACCESSION NR: AP5003998

zation of the transverse dimensions of plasma bunches was shown to be

all, Tab. / Figures.   IA

ARTSIMOVICH, L.A., akademik; KELDYSH, M.V., akademik; KAPITSA, P.L., akademik; VUL, B.M.; VERESHCHAGIN, L.F.; PISTOL'KORS, A.A.; SHCHUKIN, A.N., akademik; SKOBEL'TSYN, D.V., akademik; ALEKSANDROV, A.P., akademik; AMBARTSUMYAN, V.A., akademik; ZEL'DOVICH, Ya.B.; SEMENOV, N.N., akademik; KOTEL'NIKOV, V.A., akademik; LIFSHITS, I.M.; VEKSLER, V.I., akademik; GINZBURG, V.L.; MILLIONSHCHIKOV, M.D., akademik

Some problems in the development of modern physics; discussion of the work of the Department of General and Applied Physics. Vest. AN SSSR 35 no.2:3-46 F '65.   (MIRA 18:3)

1. Chleny-korrespondenty AN SSSR (for Vul, Vereshchagin, Pistol'kors, Lifshits, Ginzburg).

BELYAKOV, V.A.; VAN YUN-CHAN [Wang Yung-ch'ang]; VEKSLER, V.I.; VIRYASOV,
     N.M.; VRANA, I.; DU YUAN'-TSAY [Tu Yuan-ts'ai]; KIM KHI IN;
     KLODNITSKAYA, Ye.N.; KUZNETSOV, A.A.; MIKHUL, E.; NGUYEN DIN TI;
     PATERA, I.; PENEV, V.N.; SOKOLOVA, Ye.S.; SOLOV'YEV, M.I.;
     KHOFMOKL', T.; CHEN LIN-YAN'; MIKHUL, A. [Mihul, A.]

Study of Λ-hyperon and K^0-meson production in $\pi^- $ p-interactions
at an energy of 7 - 8 Billion Electron Volts. Zhur.eksp. i teor.
fiz. 44 no.2:431-443 F '63.   (MIRA 16:7)

1. Ob"yedinennyy institut yadernykh issledovaniy. 2. Sotrudnik
Instituta atomnoy fiziki v Bukhareste (for Mikhul).

L 23730-66   EnT(m)/T

ACC NR: AP6014814   SOURCE CODE: UR/0367/65/001/002/0??? /0350

AUTHOR: Belyakov, V. A.; Veksler, V. I.; Viryasov, N. M.; Kladnitskaya, Ye. N.--
Kladnitskaya, E. N.; Kopylov, G. I.; Ponev, V. N.; Solov'yev, M. I.--Solovyov, M. I.

ORG: Joint Institute of Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy)

TITLE: Baryon resonances in pi- p-interactions at 7.5 GEV with formation of strange particles

SOURCE: Yadernaya fizika, v. 1, no. 2, 1965, 338-350

TOPIC TAGS: baryon, meson, particle interaction, strange particle, hyperon, particle cross section

ABSTRACT: The formation and properties of resonances decaying into Λ-hyperons and $\pi^\pm$- mesons were studied. Data are given on the formation cross sections for Y+ (1385) and Y+ (1660)-hyperons in π^- p-interactions at 7.5 GEV/c. The properties and formation characteristics of Y+ (1385)-hyperons and their decay products were investigated. The maximum in the mass spectrum $M_{\Lambda \pi^+ \pi^-}$ at the value 1770 MEV was discussed. The authors thank Professor M. I. Podgoretskiy and Professor I. V. Chuvilo for their interest in the work and their discussions; A. Mikhul, Nugen Din Ty, A. A. Kuznetsov, Ye. S. Sokolova, Du Yuan'-tsay, Van Yun-chan and Kim Khi In for taking part in the first stage of the work. Further thanks is rendered N. F. Markov and V. Ye. Komolov, co-workers at the Computer Center, for carrying out the calculations and the group

Card 1/2

L 23730-66

ACC NR: AP6014814

of laboratory workers for the measurements. The authors also thank V. G. Grishin, A. V. Nikitin, E. G. Bubelev, and I. Kurelar for discussing the various problems of this work. Orig. art. has: 9 figures, 2 formulas, and 4 tables. [Based on authors' Eng. abst.] [JPRS]

SUB CODE: 20 / SUBM DATE: 01Sep64 / ORIG REF: 011 / OTH REF: 009

Card 2/2

L 23731-66   EWT(m)/T

ACC NR: AP6014815   SOURCE CODE: UR/0367/65/001/002/0351/0365

AUTHOR: Belyakov, V. A.; Veksler, V. I.; Viryasov, N. M.; Kladnitskaya, Ye. N.—
Kladnitskaya, E. N.; Kopylov, G. I.; Penov, V. N.; Solov'yev, M. I.—Solovyev, M. I.

ORG: Joint Institute of Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy)

TITLE: Meson resonances in pi- p-interactions at 7.5 GEV with formation of strange
particles

SOURCE: Yadernaya fizika, v. 1, no. 2, 1965, 351-365

TOPIC TAGS: pi meson, strange particle, particle interaction, K meson, mass spectrum

ABSTRACT: Resonances decaying into K° ($\bar{K}^\circ$, K+) and π-mesons are investigated. Cross sections are given for the formation of K^* (888) and k (730) π-mesons in π- p-interactions at 7.5 GEV/c in events with $\bar{K}K$ pairs, and the contribution (in %) of k°, $K^{*\circ}$-mesons in events with Λ K+ pairs is evaluated. Properties and formation characteristics of K^{*+}-mesons are described. Mass-spectra of the K2π and K3π systems are investigated. The possibility of the formation of a new resonance $U - K^\circ + \pi^\pm + \pi^\mp + \pi^\pm$ with mass 1660 MEV is indicated. An attempt is made to determine its quantum numbers. Proofs are given for the production of a resonance with mass 1050 MEV, decaying into three π-mesons ($\pi^+\pi^+\pi^-$), which can be identified as the A1-meson.

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ACC NR: AP6014815

SUB CODE: 20 / SUBM DATE: 01Sep64 / ORIG REF: 008 / OTH REF: 013

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L 29091-66   EWT(1)/EWT(m)/T/EWP(t)/ETI   IJP(c)   JD/JG

ACC NR: AP6019399   SOURCE CODE: UR/0181/65/007/006/1623/1629

AUTHOR: Ashmyanskiy, R. A.; Ben'yaminovich, M. B., Veksler, V. I.   /4

ORG: State University im. V. I. Lenin, Tashkent (Gosudarstvennyy universitet)

TITLE: Properties of the focusing of atomic collisions in cathode atomization of tungsten and molybdenum monocrystals

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1623-1629

TOPIC TAGS: single crystal, tungsten, molybdenum, angular distribution, atomization

ABSTRACT: Energy and angular distributions of the flux of scattered atoms issuing from tungsten and molybdenum monocrystals were studied by means of mercury ions. It was shown that slower particles are better focused in the $\langle 111 \rangle$ direction and faster particles focus better in the $\langle 100 \rangle$ direction. As the energy of primary ions increases, the flux of particles in the $\langle 100 \rangle$ direction increases in comparison with the flux of particles in the $\langle 111 \rangle$ direction. The authors express gratitude to O. D. Protopopov for placing monocrystal samples at their disposal. Orig. art. has: 5 figures and 2 formulas.

SUB CODE: 20, 11 / SUBM DATE: 21Oct64 / ORIG REF: 005 / OTH REF: 005

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L 4991-66   EWT(1)/EWP(e)/EWT(m)/EWP(1)/ETC/EWG(m)/EWP(t)/EWP(b)   IJP(c)

ACC NR: AP5027420 RDW/JD/JG/AT/WH   SOURCE CODE: UR/0181/65/007/011/3386/33\1

AUTHOR: Veksler, V. I.; Tsipinyuk, B. A.

ORG: State University im. V. I. Lenin, Tashkent (Gosudarstvennyy universitet)

TITLE: Secondary emission of the excited atoms of cesium during bombardment of molybdenum and tantalum with fast cesium ions

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3386-3391

TOPIC TAGS: ion emission, secondary emission, ion bombardment

ABSTRACT: A systematic investigation was made of the secondary emission of excited cesium atoms appearing during the bombardment of molybdenum and tantalum plane poly-crystalline targets (0.003 x 0.12 x 4.0 cm) with a beam of accelerated (U = 800 to 2000 ev) Cs+ ions for different angles of incidence X of the primary ions on the target surface. The instrumentation and techniques for the investigation were described previously by Veksler (FTT, 5, 2737, 1963). The targets, after degassing at 2500K, were operated at 293K. The targets could rotate around their long axis and could thus be adjusted for any value of the X angle. The distribution of the excited secon-dary atoms n(φ) and the root-mean-square values of their velocities with regard to the angle of departure φ of the secondary particles for a series of energies of primary ions in the case of a perpendicular incidence of the ion beam on the target surface (X = 0°) was obtained. It had a maximum in the direction reciprocal to the direction

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ACC NR: AP5027420

of the primary ions. It was found that the root-mean-square velocities of the excited cesium atoms varied only slightly in the investigated range of energies of the primary ions. This fact and the deformation of the shape of $n(\varphi)$ curves with the variation of energy of primary ions can be attributed to the fact that the excited atoms are knocked out by the displaced atoms of the metal lattice. The number of excited Cs atoms decreases uniformly when the angle of departure φ decreases. This occurs not only because of the cosine law but also because of the microroughness of the target surface. This is confirmed by the fact that the velocities of the excited atoms knocked out in the direction of small φ decrease rapidly, apparently because of the scattering on the inhomogeneities of the surface. Orig. art. has: 6 figures.

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SUB CODE: NP/ SUBM DATE: .11Mar65/ ORIG REF: 008/ OTH REF: 001/ ATD PRESS: 4/3/

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L 36326-66   EWT(1)/EWT(m)/EWP(t)/EI I   IJP(c)   JD/JG

ACC NR: APG015784   (A,N)   SOURCE CODE: UR/0048/66/030/005/0857/0859
                                                                                    72
AUTHOR: Veksler, V. I.   70
                                                                                     B

ORG: Tashkent State University im V.I.Lenin (Tashkentskiy gosudarstvennyy universitet)

TITLE: Effective mass in group collisions /Report, Twelfth All-Union Conference on the
Phy..cal Bases of Cathode Electronics held in Leningrad 22-26 October 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 857-859

TOPIC TAGS: ion scattering, cesium, molybdenum, crystal lattice

ABSTRACT: The author has previously shown (Zh.eksperim. i teor. fiz., 49, 90 (1965))
that in the scattering of an ion by a crystal lattice with simultaneous interaction
between the ion and several lattice atoms (group collision), the velocity of the scat-
tered ion is given as a function of the scattering angle in the hard elastic sphere
approximation by the corresponding formula for a two-body elastic collision with the
mass of the scattering atom replaced by an effective value. In .a present paper, bas-
ing his argument only on energy and momentum conservation, the author extends the above
theorem to the case of arbitrary interaction between the scatte.. `ion and the scatter-
ing atoms. The calculation, however, is performed only for the case of interaction
with four lattice atoms initially located at the corners of a square and with the inci-
dent ion moving in a plane of symmetry, and the formula derived for the effective mass,

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ACC NR: APG015784   2.

although it does not directly involve the scattering angle, involves the velocities after collision of the scattering atoms. It is argued that the maximum value of the effective mass should be a function of the maximum potential energy of the collision, and that for large scattering angles it should be a function of the energy in the center of mass system transferred from the ion to the lattice in the collision. Experimental data on the scattering of 40 to 260 eV Ca^+ ions through angles from 63 to 126° by a polycrystalline Mo target were obtained by a technique described elsewhere by the author (Fiz. tverdogo tela, 6, 2229 (1964)). The energy transfer for each scattering event (group collision) was derived from the experimental data by a method described in the reference just cited, and the maximum potential energy was calculated from the experimental data in the hard elastic sphere approximation. The experimental effective mass for each group collision was plotted against the corresponding energy transfer and, in a separate graph, against the maximum potential energy. In each plot the experimental points fell, with some scatter, near a smooth curve. It is concluded that the effective mass depends very weakly on the scattering angle and that the force between the ion and a lattice atom falls off rapidly with increasing distance. Orig. art. has: 4 formulas and 2 figures.

SUB CODE: 20/   SUBM DATE: 00/   ORIG REF: 002/   OTH REF: 000

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L 36327-66   EWT(1)/EWT(m)/T/EWP(t)/ETI   IJP(c)   JD/JG

ACC NR: APG015785   (A, N)   SOURCE CODE: UR/0048/66/030/005/0860/0864

AUTHOR: Veksler, V. I.

ORG: Tashkent State University im. V.I.Lenin (Tashkentskiy gosudarstvennyy universitet)

TITLE: Models of the mechanism of scattering of slow ions from metal surfaces /Report, Twelfth All-Union Conference on the Physical Bases of Cathode Electronics held in Leningrad 22-26 October 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 860-864

TOPIC TAGS: ion scattering, multiple scattering, cesium, rubidium, potassium, tungsten, molybdenum, crystal lattice, single crystal

ABSTRACT: Experimental data on the scattering of low energy (100 to 260 eV) Cs^+, Rb^+, and K^+ ions on single crystal Mo and W targets were obtained by techniques described elsewhere by the author (Zh. eksperim. i teor. fiz., 49, 90 (1965)). These data, together with some data in the literature, are discussed at length in relation to the following two models of the scattering process: the Multiple Scattering Model, in which the ion is assumed to be scattered successively by several lattice atoms, and the Group Scattering Model, in which the ion is assumed to be scattered simultaneously by several lattice atoms. The experimental technique was such that the maximum energy of the scattered ions could be determined; most of the discussion is based on the behavior of

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